

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application.

COMPLETE LISTING OF THE CLAIMS:

Claims 1-15 : (Canceled)

Claim 16 : (Currently Amended) A digital tuner comprising a single frequency changer of one of a zero intermediate frequency changer and a near-zero intermediate frequency changer, said frequency changer comprising: an oscillator arrangement; a first multiplier having a first input for receiving an input signal in a first frequency band, and a second input connected to said oscillator arrangement; and said oscillator arrangement comprising a first oscillator for supplying a first signal in said first frequency band to said second input of said first multiplier, a second oscillator for producing a second signal in a second frequency band outside said first frequency band, and a fixed frequency reference oscillator, said first oscillator being phase-locked to said second oscillator, and said second oscillator being phase-locked to said reference oscillator.

Claim 17 : (Currently Amended) The ~~frequency changer~~ tuner as claimed in claim 16, in which said second frequency band is lower than said first frequency band.

Claim 18 : (Currently Amended) The ~~frequency changer~~ tuner as claimed in claim 16, in which said first frequency band is within 950 to 2150 MHz.

Claim 19 : (Currently Amended) The ~~frequency changer~~ tuner as claimed in claim 16, in which said second frequency band is within a UHF band.

Claim 20 : (Currently Amended) The ~~frequency changer~~ tuner as claimed in claim 19, in which said second frequency band is within 400 to 600 MHz.

Claim 21 : (Currently Amended) The ~~frequency changer~~ tuner as claimed in claim 16, comprising a low pass filter, said first multiplier having an output for supplying an output signal to said low pass filter.

Claim 22 : (Currently Amended) The ~~frequency changer~~ tuner as claimed in claim 21, in which said low pass filter has a cut-off frequency of between 5 MHz and 40 MHz.

Claim 23 : (Currently Amended) The ~~frequency changer~~ tuner as claimed in claim 16, comprising a second multiplier having a first input for receiving said input signal, and a second input connected to said oscillator arrangement for receiving a quadrature signal which is in quadrature with said first signal.

Claim 24 : (Currently Amended) The ~~frequency changer~~ tuner as claimed in claim 23, comprising a phase adjusting network, to which said first oscillator is connected, for forming said first signal and said quadrature signal.

Claim 25 : (Currently Amended) The ~~frequency changer~~ tuner as claimed in claim 23, in which said first oscillator comprises a ring oscillator having first and second outputs for supplying said first signal and said quadrature signal.

Claim 26 : (Currently Amended) The ~~frequency changer~~ tuner as claimed in claim 16, in which said first oscillator has a control input, and said first and second oscillators form part of a first phase-locked loop comprising: a first programmable divider; a first comparator having an output, a first input connected via said first programmable divider to said first oscillator,

and a second input connected to said second oscillator; and a first control loop connected between said output of said first comparator and said control input of said first oscillator.

Claim 27 : (Currently Amended) The ~~frequency changer~~ tuner as claimed in claim 26, in which said first programmable divider has selectable divisors of two, three and four.

Claim 28 : (Currently Amended) The ~~frequency changer~~ tuner as claimed in claim 16, in which said second oscillator has a control input, and said second and reference oscillators form part of a second phase-locked loop comprising: a second programmable divider; a third programmable divider; a second comparator having an output, a first input connected via said second programmable divider to said second oscillator, and a second input connected via said third programmable divider to said reference oscillator; and a second control loop connected between said output of said second comparator and said control input of said second oscillator.

Claim 29 : (Currently Amended) The ~~frequency changer~~ tuner as claimed in claim 16, in which said first multiplier and said oscillator arrangement are formed in a monolithic integrated circuit.

Claim 30 : (Canceled)

Claim 31 : (New) A frequency changer of one of a zero intermediate frequency changer and a near-zero intermediate frequency changer, comprising: an oscillator arrangement; a first multiplier having a first input for receiving an input signal in a first frequency band, and a second input connected to said oscillator arrangement; and said oscillator arrangement comprising a first oscillator for supplying a first signal in said first frequency band to said second input of said first multiplier, a second oscillator for producing a second signal in a second frequency band outside said first frequency band, and a reference oscillator, said first oscillator being phase-

locked to said second oscillator, said second oscillator being phase-locked to said reference oscillator, said first oscillator having a control input, and said first and second oscillators forming part of a first phase-locked loop comprising: a first programmable divider having selectable divisors of two, three and four; a first comparator having an output, a first input connected via said first programmable divider to said first oscillator, and a second input connected to said second oscillator; and a first control loop connected between said output of said first comparator and said control input of said first oscillator.

Claim 32 : (New) The frequency changer as claimed in claim 31, in which said second frequency band is lower than said first frequency band.

Claim 33 : (New) The frequency changer as claimed in claim 31, in which said first frequency band is within 950 to 2150 MHz.

Claim 34 : (New) The frequency changer as claimed in claim 31, in which said second frequency band is within a UHF band.

Claim 35 : (New) The frequency changer as claimed in claim 34, in which said second frequency band is within 400 to 600 MHz.

Claim 36 : (New) The frequency changer as claimed in claim 31, comprising a low pass filter, said first multiplier having an output for supplying an output signal to said low pass filter.

Claim 37 : (New) The frequency changer as claimed in claim 36, in which said low pass filter has a cut-off frequency of between 5 MHz and 40 MHz.

Claim 38 : (New) The frequency changer as claimed in claim 31, comprising a second multiplier having a first input for receiving said input signal, and a second input

connected to said oscillator arrangement for receiving a quadrature signal which is in quadrature with said first signal.

Claim 39 : (New) The frequency changer as claimed in claim 38, comprising a phase adjusting network, to which said first oscillator is connected, for forming said first signal and said quadrature signal.

Claim 40 : (New) The frequency changer as claimed in claim 38, in which said first oscillator comprises a ring oscillator having first and second outputs for supplying said first signal and said quadrature signal.

Claim 41 : (New) The frequency changer as claimed in claim 31, in which said second oscillator has a control input, and said second and reference oscillators form part of a second phase-locked loop comprising: a second programmable divider; a third programmable divider; a second comparator having an output, a first input connected via said second programmable divider to said second oscillator, and a second input connected via said third programmable divider to said reference oscillator; and a second control loop connected between said output of said second comparator and said control input of said second oscillator.

Claim 42 : (New) The frequency changer as claimed in claim 31, in which said first multiplier and said oscillator arrangement are formed in a monolithic integrated circuit.

Claim 43 : (New) A frequency changer of one of a zero intermediate frequency changer and a near-zero intermediate frequency changer, comprising: an oscillator arrangement; a first multiplier having a first input for receiving an input signal in a first frequency band, and a second input connected to said oscillator arrangement; and said oscillator arrangement comprising a first oscillator for supplying a first signal in said first frequency band to said second

input of said first multiplier, a second oscillator for producing a second signal in a second frequency band outside said first frequency band, and a reference oscillator, said first oscillator being phase-locked to said second oscillator, said second oscillator being phase-locked to said reference oscillator, said first oscillator having a control input, and said first and second oscillators forming part of a first phase-locked loop comprising: a first programmable divider; a first comparator having an output, a first input connected via said first programmable divider to said first oscillator, and a second input connected to said second oscillator; and a first control loop connected between said output of said first comparator and said control input of said first oscillator and having a bandwidth which covers said first frequency band.

Claim 44 : (New) The frequency changer as claimed in claim 43, in which said second frequency band is lower than said first frequency band.

Claim 45 : (New) The frequency changer as claimed in claim 44, in which said first frequency band is within 950 to 2150 MHz.

Claim 46 : (New) The frequency changer as claimed in claim 43, in which said second frequency band is within a UHF band.

Claim 47 : (New) The frequency changer as claimed in claim 46, in which said second frequency band is within 400 to 600 MHz.

Claim 48 : (New) The frequency changer as claimed in claim 43, comprising a low pass filter, said first multiplier having an output for supplying an output signal to said low pass filter.

Claim 49 : (New) The frequency changer as claimed in claim 48, in which said low pass filter has a cut-off frequency of between 5 MHz and 40 MHz.

Claim 50 : (New) The frequency changer as claimed in claim 43, comprising a second multiplier having a first input for receiving said input signal, and a second input connected to said oscillator arrangement for receiving a quadrature signal which is in quadrature with said first signal.

Claim 51 : (New) The frequency changer as claimed in claim 50, comprising a phase adjusting network, to which said first oscillator is connected, for forming said first signal and said quadrature signal.

Claim 52 : (New) The frequency changer as claimed in claim 50, in which said first oscillator comprises a ring oscillator having first and second outputs for supplying said first signal and said quadrature signal.

Claim 53 : (New) The frequency changer as claimed in claim 43, in which said first programmable divider has selectable divisors of two, three and four.

Claim 54 : (New) The frequency changer as claimed in claim 43, in which said second oscillator has a control input, and said second and reference oscillators form part of a second phase-locked loop comprising: a second programmable divider; a third programmable divider; a second comparator having an output, a first input connected via said second programmable divider to said second oscillator, and a second input connected via said third programmable divider to said reference oscillator; and a second control loop connected between said output of said second comparator and said control input of said second oscillator.

Claim 55 : (New) The frequency changer as claimed in claim 43, in which said first multiplier and said oscillator arrangement are formed in a monolithic integrated circuit.